

LIST OF CURRENT CLAIMS

1. (Currently Amended) A clamping apparatus ~~which for detachably fixes~~ fixing a movable member (M) to a reference member (R), comprising: wherein

an annular plug portion (21) having an outer peripheral side and projecting ~~projects from the~~ a reference member (R) toward a leading end direction, and having a tapered outer peripheral surface (28, 54) which narrows toward the leading end direction is arranged on the outer peripheral side of the plug portion (21); ~~said~~ and the movable member (M) is provided with a tapered inner peripheral surface (12, 53) configured to engage ~~which engages with~~ the tapered outer peripheral surface (28, 54); [[,]]

a transmission member (29) is supported by within a leading end of a cylindrical ~~hole opening~~ (21a) in of the plug portion (21) so as to be axially movable within the opening over a predetermined range; ~~while a rod (31) is inserted located~~ in the cylindrical ~~hole opening~~ (21a) so as to be axially movable therein, the latter located in a position closer to the reference member (R) than the transmission member (29) [[,]]

whereby during a ~~in the~~ clamping operation, the rod (31) is may be driven toward a base end direction to of the reference member (R) by a driving means device (D) ~~which is provided in the reference member (R), and said rod (31) having an output portion (36) of the rod (31) moves arranged to move~~ the movable member (M) toward the reference member (R); ~~and a transmission gap (G) is formed between a pushing portion (31a) of a leading end of the rod (31) and a pressure force receiving portion (29b) of the transmission member (29);~~ [[,]]

whereby during a clamping operation, the rod (31) may be driven toward a base end direction of the reference number (R) by ~~in the unclamping operation, the rod (31) is~~ may be driven toward the leading end direction by the driving means device (D), such that ~~and the pushing portion (31a) of the rod (31) pushes the movable member (M) through via~~ the transmission member (29).

2. (Currently Amended) The clamping apparatus as set forth in claim 1, wherein [[,]]

said ~~in the unclamping operation, the rod (31) is arranged to push~~ pushes the movable member (M) ~~through via~~ the transmission member (29) to form a fitting gap

(alpha) between the tapered outer peripheral surface (28, 54) and the tapered inner peripheral surface (12, 53) during an unclamping operation.

3. (Currently Amended) The clamping apparatus as set forth in claim 1 ~~or 2 wherein,~~ including

an annular shuttle member (23), which is diametrically expandable and contractable ~~expands and contracts~~, is provided with its an inner peripheral surface fitted onto the plug portion (21) so as to axially reciprocate relative to the plug portion over within a predetermined range, ~~while the said~~ outer peripheral surface of the shuttle member (23) serving as ~~the said~~ tapered outer peripheral surface (28); [[,]] and

an advancing device means (24) ~~is provided~~ arranged to move the shuttle member (23) in such a direction as to tighten the tapering engagement.

4. (Currently Amended) The clamping apparatus as set forth in claim 1 , including ~~or 2 wherein,~~

an annular shuttle member (23), which is diametrically ~~expands~~ expandable and contracts contractable, ~~is provided with~~ and having an outer peripheral surface fitted into the movable member (M) so as to axially reciprocate within the movable member over a predetermined range, ~~while the said~~ inner peripheral surface of the shuttle member (23) serving as ~~the said~~ tapered inner peripheral surface (53), and

an advancing device means (24) ~~is provided~~ arranged to move the shuttle member (23) in such a direction as to tighten the tapering engagement.

5. (Currently Amended) A clamping apparatus for fixing ~~which fixes~~ a surface (T) of a movable member (M) to be supported ~~of a movable member (M)~~ relative to a support surface (S) of a reference member (R) with alignment of ~~by aligning~~ the movable member (M) with the reference member (R), ~~wherein comprising~~

a socket bore (11) ~~is opened~~ in the surface (T) of a movable member (M) to be supported ~~of the movable member (M)~~ to define a positioning hole (12) and an engaging hole (13) in ~~this~~ the recited order ~~from outwardly of~~ the opening edge of the socket bore (11)[[,]] ;

an annular plug portion (21) ~~which is to be~~ inserted into the socket bore (11) is ~~projected and projecting~~ from the reference member (R) toward a leading end direction, a shuttle member (23), which is diametrically expandible and contractable ~~expands and contracts~~, is arranged between the plug portion (21) and the positioning hole (12); ~~and the~~ said shuttle member (23) is supported by either the plug portion (21) or the positioning hole (12) so as to be axially reciprocable over ~~reciprocate within~~ a predetermined range; ~~and the~~ said shuttle member (23) ~~makes~~ making a tapering engagement with the positioning hole; ~~other~~, and a tapered surface (28, 53) of the shuttle member (23) is formed to narrow toward the engaging hole (13) ; ~~and~~ an advancing means device (24) arranged ~~is provided~~ to move the shuttle member (23) in ~~such~~ a direction so as to tighten the tapering engagement; [[,]]

a transmission member (29) is supported within by a leading end of a cylindrical hole (21a) in of the plug portion (21) so as to be axially movable therein within a predetermined range; ~~while~~ a rod (31) located within ~~is inserted into~~ the cylindrical hole (21a) so as to be axially movable thereon; [[,]] the rod ~~latter~~ located in a position closer to the reference member (R) than the transmission member (29); ~~and~~ an engaging member (34), ~~which is~~ movable between a radially outward engaging position (X) and a radially inward disengaging position (Y); ~~is arranged in~~ on the outer peripheral space area of the rod (31),

~~in the clamping operation~~, a driving means device (D) provided in on the reference member (R) arranged to drive ~~drives~~ the rod (31) in a direction toward a base end direction ~~to of~~ the reference member (R), to thereby enable ~~enabling~~ an output portion (36) of the rod (31) to ~~switch over~~ move the engaging member (34) to the engaging position (X) for engaging the engaging member (34) with the engaging hole (13) to move the movable member (M) toward the reference member (R) during a clamping operation; [[,]] and a transmission gap (G) provided ~~is formed~~ between a pushing portion (31a) of a leading end of the rod (31) and a pressure receiving portion (29b) of the transmission member (29) during a clamping operation; [[,]]

~~in the unclamping operation~~, the said driving device means (D) arranged to drive ~~drives~~ the rod (31) toward the leading end direction, to thereby allowing enable the engaging member (34) to move ~~switch over~~ to the disengaging position (Y), ~~so that~~ such that the pushing portion (31a) of the rod (31) pushes a top wall (11a) of the

socket bore (11) ~~through~~ via the transmission member (29) during an unclamping operation.

6. (Currently Amended) The clamping apparatus as set forth in claim 5 wherein,

~~In the unclamping operation, the said rod (31) is arranged to push~~ pushes the movable member (M) ~~through~~ via the transmission member (29) to form a fitting gap (alpha) on the tapered surface (28,53) of the shuttle member (23) and a contact gap (beta) between the support surface (S) and the surface (T) to be supported.

7. (Currently Amended) The clamping apparatus as set forth in claim 1, including ~~any one of claims 1 through 6 wherein,~~

a resilient member (32) is disposed between the rod (31) and the transmission member (29) to urge the transmission member (29) and arranged toward the leading end direction.

8. (Currently Amended) The clamping apparatus as set forth in claim 1, any one of claims 1 through 7 wherein[[,]]

the reference member (R) includes ~~is provided with~~ a supply port (41) for a cleaning fluid, ~~while~~ and the transmission member (29) includes ~~is provided with~~ a blowout hole (42) for exiting the cleaning fluid; [[,]] and said ~~the~~ rod (31) is provided with a flow passage (44) through which the supply port (41) and the blowout hole (42) communicate with each other.

9. (New) The clamping apparatus as set forth in claim 5, including

a resilient member (32) disposed between the rod (31) and the transmission member (29) and arranged to urge the transmission member (29) toward the leading end direction.

10. (New) The clamping apparatus as set forth in claim 5, wherein
the reference member (R) includes a supply port (41) for a cleaning fluid, and the transmission member (29) includes a blowout hole (42) for exiting the cleaning fluid; and said rod (31) is provided with a flow passage (44) through which the supply port (41) and the blowout hole (42) communicate with each other.